

TABLE 34.—Results of cracking naphthalene under various conditions of temperature and pressure.

Temperature, °C.....	650	650	650	725	725	725	800	800	800
Pressure, atmospheres...	(a)	1	12	(a)	1	12	(a)	1	12
Material used, grams.....	400	400	432	400	414	384	400	500	427
Material recovered, per cent.....	76.0	65.7	30.0	66.4	65.4	85.9	80.8	19.8
Carbon produced, per cent.....	0.0	3.3	21.0	3.5	7.0	40.0	9.5	13.6	5.0

QUALITATIVE RESULTS OF DISTILLATION.

First drop at (°C.).....	205	200	205	200	210
Naphthalene ^b	+	+	+	+	+	+	+	+	+
Anthracene ^b	-	-	-	+	+	+	+	+	+

^a Vacuum.^b Presence (or absence) indicated by plus (or minus) sign.

TABLE 35.—Results of cracking anthracene under various conditions of temperature and pressure.

Temperature, °C.....	650	725
Pressure, atmosphere.....	1	(a)
Material used, grams.....	125	125
Material recovered, per cent.....	63.2	56.0
Carbon produced, per cent.....	18.0	22.0

QUALITATIVE RESULTS OF DISTILLATION.

First drop at (°C.).....	300
Naphthalene ^b	-	-
Anthracene ^b	+	+

^a Vacuum.^b Presence (or absence) indicated by plus (or minus) sign.

RECOVERIES OF LIQUID PRODUCTS.

A first point to be considered is the yield of liquid reaction products obtained when the hydrocarbons were cracked under various conditions of temperature and pressure. This percentage represents the total of liquid products and of solid products soluble therein, except carbon and gas. The figures given are representative in a way of the stability of the various compounds, their resistance to conversion into carbon and gas being indicated by the proportion of liquid product obtained.

It appears that as regards the four liquid hydrocarbons the order of decreasing stability is benzene, toluene, xylene, and cymene. This is as would be expected, on the theory that with similar molecular forms the more unwieldy units of matter are the more easily broken down.

The yield decreased with increase in temperature and in general with increase in pressure. Table 36, showing the recoveries of liquid reaction products, follows:

TABLE 36.—Results of cracking four aromatic hydrocarbons under various conditions of temperature and pressure, showing percentages of liquid reaction products recovered.

Hydrocarbon cracked.	Temperature.	Percentage of liquid reaction product recovered at pressures of—				Average percentage recovered.
		Vacuum.	1 atmosphere.	12 atmospheres.	18 atmospheres.	
	°C.					
Cymene.....	650	83.0	62.0	53.3	40.8	38.8
Do.....	725	52.0	40.0	27.5	25.0	
Do.....	800	49.0	17.6	15.8	.0	
Xylene.....	650	95.0	69.0	66.0	64.3	54.2
Do.....	725	72.0	60.0	54.2	46.6	
Do.....	800	66.0	27.1	31.7	11.5	
Toluene.....	650	98.0	98.3	94.8	60.8	59.3
Do.....	725	85.0	64.2	48.3	18.0	
Do.....	800	66.0	32.5	34.2	11.7	
Benzene.....	650	90.0	86.6	87.5	73.1	65.5
Do.....	725	94.0	90.0	58.3	53.3	
Do.....	800	87.0	62.0	22.5	18.3	

ORIGINAL HYDROCARBONS RECOVERED.

The percentage of original product recovered is another index of the stability of the compound cracked. It represents total resistance to transformation, whereas the recovery figures for liquid products represent resistance to conversion into carbon and gas. It appears that the order of stability is the same as that indicated in Table 36, but that there are greater differences. The effects of temperature and pressure are analogous to those indicated in the earlier table. Table 37, showing the percentages of original hydrocarbons recovered, is presented below:

TABLE 37.—Results of cracking four aromatic hydrocarbons under various conditions of temperature and pressure, showing percentages of original hydrocarbons recovered.

Hydrocarbon cracked.	Temperature.	Percentage of original hydrocarbon recovered at pressures of—				Average percentage recovered.
		Vacuum.	1 atmosphere.	12 atmospheres.	18 atmospheres.	
	°C.					
Cymene.....	650	34.5	21.6	21.3	10.6	11.9
Do.....	725	17.0	5.4	3.0	7.5	
Do.....	800	14.5	1.6	5.7	.0	
Xylene.....	650	80.0	37.7	31.7	45.0	30.6
Do.....	725	52.5	40.0	27.0	26.0	
Do.....	800	35.6	4.5	7.9	1.1	
Toluene.....	650	91.6	85.0	55.0	31.0	37.1
Do.....	725	70.5	34.0	7.5	2.7	
Do.....	800	49.5	6.6	7.5	4.0	
Benzene.....	650	73.5	66.5	59.4	57.0	50.7
Do.....	725	77.5	61.5	39.7	42.3	
Do.....	800	63.0	35.6	16.1	12.1	